

## **Picturing Math Development**

Illustrations of infants, toddlers and preschoolers will be put on this cover page

# Number and Operations

*Picture: Adult or older child holding two toys, one in each hand, in front of supine or propped up infant; infant attending to toy – looking and reaching*

**Looks at one toy then at another**

Bayley, 2006

*Picture: Adult near infant who is sitting independently and shaking a rattle*

**Plays with one toy at a time**

Langer, 2003; Bayley, 2006

*Picture: Adult with infant in high chair holding a ring in each hand bringing his hands toward midline*

**Plays with two toys at the same time**

Langer, 2003; Parks, 2004

*Picture: Infant sitting independently on a blanket on floor, adding an object to a pile of objects*

**Makes groups of objects, then changes amount**

Parks, 2004; Langer, 2003

*Picture: Toddler standing holding one shoe, looking under the table*

**Looks for missing object from a pair or group of three**

Feigenson & Carey, 2003;  
Wagner & Walters, 1982; Starkey, 1992

*Picture: Toddler putting two plates on the table. One plate in front of friend who is seated at the table and second plate at the child's chair*

**Hands out objects giving one to each person**

Mix, et al, 2002; Mix, 2002

*Picture: Child sitting at the table with a bowl of raisins with a cartoon bubble with the words the child is speaking: "I have a lot."*

**Talks about quantity using words like "a lot," "many," "more," etc.**

Wagner & Walters, 1982

*Picture: Child gives two blocks to a friend who is building with blocks and needing more blocks.*

**Knows adding to a group makes "more," taking away objects makes "less"**

Cooper, 1984; Houde, 1997;  
Huttenlocher, Jordan, & Levine, 1994; Sophian & Adams, 1982; Starkey, 1992

# Number and Operations

*Picture: Child holding a cracker in each hand with a cartoon bubble with the words the child is speaking: "I have two."*

**Understands and begins to use the number word "two" correctly.**

Baroody, 2004; Parks, 2004; Wagner & Walters, 1982

*Picture: Three-year old sitting on the floor in the block area, pointing to the last of five cars, with a cartoon bubble with the words the child is speaking: "One, two, three, four, five, six."*

**When asked "How many?," points to objects and says number words (may count objects twice or use numbers out of order)**

Wagner & Walters, 1982

*Picture: Teacher asking child for three objects, with a cartoon bubble with the words the teacher is speaking: "Give me three."*

**Gives one, two, three or four items upon request**

Baroody, 2004

*Picture: Child adds one counting bear to two bears on a table, with a cartoon bubble with the words the child is speaking: "Now I have three."*

**Correctly adds and subtracts up to three objects without counting**

Baroody, 2004; Clements, 2004; Hughes, 1986; Starkey & Gelman, 1982

*Picture: Child putting each of his five cars in correspondence with his friends five cars, with a cartoon bubble with the words: "We have the same."*

**Compares two groups of objects by matching or counting for up to five objects**

Clements, 2004

*Picture: Adult with cartoon bubble with the words: "We need eight cups." Child counting cups, with a cartoon bubble with the words: "I have eight."*

**Counts up to ten objects to find out how many in a group**

Baroody, 2004

*Picture: Two children making a train by putting a three car train and a two car train together with adult and a cartoon bubble with the words: "How long is your train now?"*

**Uses counting to solve simple everyday problems with objects**

Baroody & Ginsburg, 1982; Hughes, 1986; Ginsburg & Russell, 1981

*Picture: Child pointing to the numeral 5 with a cartoon bubble with the words: "Five. That's how many years old I am!"*

**Reads some written numerals and knows their meaning**

Baroody, 2004

